METHOD AND APPARATUS FOR GEOMETRIC VARIATIONS TO INTEGRATE PARAMETRIC COMPUTER AIDED DESIGN WITH TOLERANCE ANALYSES AND OPTIMIZATION

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Abstract of the Disclosure

The objective of the invention is a bi-level method for modeling geometric tolerances compatible with the ANSI/ASME tolerance standard. At the local level, the model represents each tolerance-zone for a plane or an axis (line) as a tolerance map, and it includes the computational techniques that relate interdependencies between these regions and subregions within them. The model includes formulations for variations in size, form, orientation, position, and runout, and combinations of these, because all of these variations can be modeled using points, lines, and planes. Since variations in simple profiles that are formed from lines and circular arcs also can be described by such combinations, they too are includable in the formulation. The primary method is to overlay the geometry of tolerance-zones onto some traditional modes for representing planes, lines, and points. At the global level, the model inter-relates all frames of reference on a part or an assembly.

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